

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC., NOKIA OF AMERICA CORP., AT&T SERVICES, INC.,
CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, GOOGLE LLC, AND
T-MOBILE USA, INC.,
Petitioners,

v.

PEGASUS WIRELESS INNOVATION LLC,
Patent Owner.

Case IPR2025-00083
U.S. Patent No. 10,638,463

PATENT OWNER'S RESPONSE

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PATENT OWNER'S EXHIBIT LIST

Exhibit No.	Description
2001	Memorandum Opinion and Order in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al.</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex Dec. 11, 2024)
2002	Memorandum Opinion and Order in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al.</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex Dec. 23, 2024)
2003	Reserved
2004	Defendants' Preliminary Invalidity Contentions in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al.</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex May 17, 2024)
2005	Declaration of Jacob Sharony, Ph.D.
2006	Deposition Transcript of Sumit Roy, Ph.D., dated October 6, 2025
2007-2017	Reserved
2018	Comparison of Districts Within the Fifth Circuit — 12-Month Period Ending September 30, 2024 (available at https://www.uscourts.gov/sites/default/files/2025-02/fcms_na_distcomparison1231.2024.pdf)
2019	Appendix H to Defendants' Preliminary Invalidity Contentions in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al.</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex May 17, 2024)
2020	Ex. H-8 of Appendix H to Defendants' Preliminary Invalidity Contentions in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al.</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex May 17, 2024)
2021	Ex. H-9 of Appendix H to Defendants' Preliminary Invalidity Contentions in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al.</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex May 17, 2024)
2022	Ex. H-3 of Appendix H to Defendants' Preliminary Invalidity Contentions in <i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al.</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex May 17, 2024)

IPR2025-00083 Patent Owner's Response

2023	U.S. Patent Pub. No. 2020/0252180 (Takeda counterpart)
2024	U.S. Patent Pub. No. 2017/0265176 (Marinier counterpart)
2025-2203	Reserved
2204	Fifth Amended Docket Control Order, issued April 14, 2025

Pursuant to 37 C.F.R. § 42.120, Pegasus Wireless Innovation LLC (“Pegasus” or “Patent Owner”) files this response to the Petition, setting forth reasons why the Petition for *inter partes* review (“IPR”) of claims 1-9 of U.S. Patent No. 10,638,463 (the “’463 patent”), as requested by Ericsson Inc., Nokia of America Corp., AT&T Services, Inc., Cellco Partnership d/b/a Verizon Wireless, Google LLC, and T-Mobile USA, Inc. (“Petitioners”), fails to establish unpatentability of any challenged claim. This POR is supported by the Declaration of Dr. Jacob Sharony (Ex. 2005, also referred to herein as “Sharony”), and cites to the deposition of Petitioners’ expert, Dr. Roy (Ex. 2006, also referred to herein as “Roy”).

I. INTRODUCTION

The Petition challenges claims 1-9 of the ’463 patent based on combinations including primary references that disclose the use of bandwidth parts (BWPs), which represent a subdivided component carrier, and a secondary reference that discloses a technique for coordinating a resource set from among multiple resource sets to be used for transmission of uplink control information (“UCI”) from a user equipment to the base station. This secondary reference, Yan, does not account for BWPs, however, and therefore only provides resource sets to be selected for UCI transmission within the component carrier to be used for transmission.

Importantly, none of the references relied upon in the Petition discloses or suggests

the claimed requirement of uplink *control channel resource sets* that are *configured for each uplink BWP* that is configured for the user equipment.

Petitioners' primary references, Takeda and Marinier, are each relied upon in the Petition to disclose BWPs. But neither Takeda nor Marinier discloses or suggests the claimed requirement of uplink *control channel resource sets* that are *configured for each uplink BWP* that is configured for the user equipment. For example, while Takeda discloses BWP-dependent resource mapping, Takeda does not disclose distinct UE-specific PUCCH (physical uplink control channel) resource sets for each configured UL BWP. And while Petitioner proposes combining each of these primary references with Yan in order to incorporate Yan's use of resource sets with Takeda's and Marinier's BWPs, the basis for these combinations is tainted by clear hindsight reconstruction bias, and no motivation exists to recreate the challenged claims specifically as claimed. *See Sharony*, ¶60.

Petitioners contend that these combinations are supported first by Yan's disclosure that its method avoids UCI mismatch, namely allocating UCI transmission resources that are excessive or insufficient to carry the quantity of bits required in the UCI transmission. As a result of this mismatch, Yan discloses that "utilization of the uplink channel is relatively low or UCI bits are discarded." Yan, 1:63-2:6. But a POSITA reading primary reference Takeda would understand that Takeda does not suffer from this problem of UCI mismatch, and already contains

and adopts solutions that avoid any UCI mismatch. At minimum, because Takeda adopts BWPs as used in 5G NR, a POSITA would have looked to 5G NR concepts for addressing UCI efficiencies, not to previous generation (4G LTE) technology disclosed by Yan that increases the UE processing burden unnecessarily. *See Sharony*, ¶61.

Indeed, Yan and Takeda address different, unrelated problems. Yan addresses inefficiencies in control signaling for UCI to avoid underutilizing uplink resources. Yan, 2:1-6; 2:64-3:3. Yan aims to minimize signaling overhead and simplify control channel configuration. Yan, 2:10-15 (“to reduce consumption of downlink channel resources”). Takeda on the other hand is concerned with reducing UE power consumption and blind decoding overhead by activating or deactivating bandwidth parts (BWPs). Takeda, [0029], Abstract. Takeda introduces added signaling complexity, such as control signaling to support multiple BWPs. Combining Takeda with Yan would require substantial modification to Yan, including introducing BWP-level partitioning into Yan's resource model. Thus, a POSITA aiming to reduce signaling, as Yan proposes, would be disincentivized from adopting Takeda's complex signaling approach. In addition, Yan requires additional UE processing to adjust resources capacity (to match UCI size) resulting in extra UE power consumption which contrasts Takeda's reduced UE power consumption thanks to BWPs. *See Sharony*, ¶62.

Therefore, a POSITA would not view Takeda as requiring the solutions taught by Yan. There is simply no reason to modify Takeda in view of Yan, as alleged in the Petition.

The asserted combination of Marinier and Yan suffers from different—but also fatal—problems. While Petitioners contend that Marinier discloses the concept of BWPs, Petitioners also acknowledge that Marinier does so in the environment predating 5G NR, e.g., 4G LTE, which does not adopt BWPs within the standard. Not only is Marinier directed to a precursor to 5G NR that does not recognize the 5G NR-based concept of BWPs, but Marinier adopts frequency segregation for the purpose of avoiding conflicts and collisions in concurrent transmissions, and each bandwidth portion of Marinier's frequency partition is active. Similarly, Yan is exclusively directed to 4G LTE. This is important because the challenged claims include and claim the concept of BWPs being configured for a user equipment. Notably, BWPs that are configured for a user equipment do not have to be active for uplink or downlink, and therefore may be configured but inactive. This is a 5G NR concept. Marinier and Yan, which are 4G LTE technologies, fail to disclose or suggest this concept, and therefore do not disclose or suggest the '463 patent's claimed concept of configuring multiple resource sets for every BWP that is configured for a user equipment, regardless of whether those BWPs are active. Indeed, a POSITA reading Yan would not have a

reason to configure multiple resource sets for each BWP that is configured for a user equipment, and instead at best would instruct a POSITA to only configure resource sets for the component carrier (i.e., the active channel). Thus, even if combined, Yan and Marinier fail to disclose or suggest the claimed concept of multiple BWPs that are configured for a UE. *See* Sharony, ¶63.

Further, Marinier, Yan, and R1-1711853 address different problem domains. Marinier describes uplink operation from a wireless transmit/receive unit (WTRU) to multiple serving sites. Since this operation might cause uplink collisions (if some transmissions use the same uplink resources), Marinier teaches frequency/time separation to avoid such uplink collisions. There is no reason a POSITA would attempt to combine solutions from multi-site uplink conflict resolution (Marinier), reduced signaling overhead for PUCCH resource set selection (Yan), and BWP activation/deactivation (R1-1711853). Marinier does not use BWPs in a 5G NR context, and instead selects uplink resources to avoid uplink collisions, which is unrelated to BWP and PUCCH-level control. *See* Sharony, ¶64.

Considered in full, there is no teaching or suggestion in any reference or evidence submitted with the Petition to have resource sets based on configuration of a BWP for a user equipment, rather than an activation status of a BWP for a user

equipment. That concept appears only in the challenged claims, and is manufactured in the Petition based only on hindsight reconstruction.

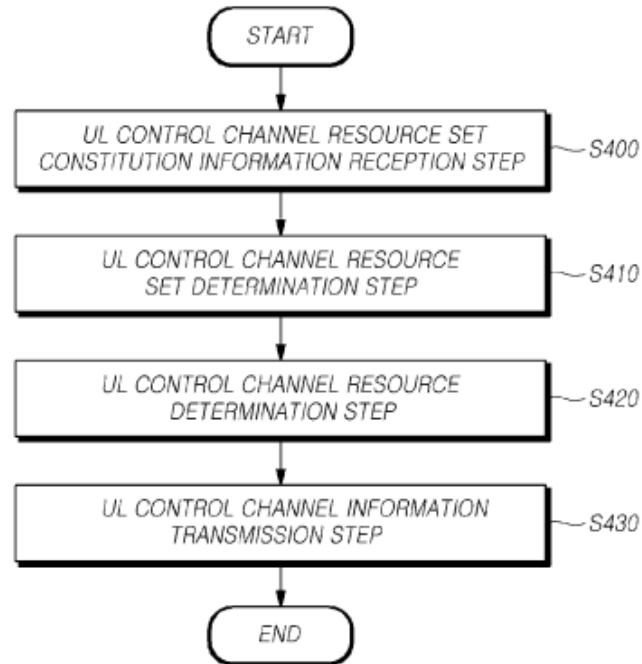
Besides having no motivation to combine the asserted references, it is shown below that the combinations of Takeda and Yan (Ground 1), and of Marinier, Yan and R1-1711853 (Ground 2) are deficient and do not teach, suggest, or disclose all the limitations of the challenged claims.

II. THE '463 PATENT

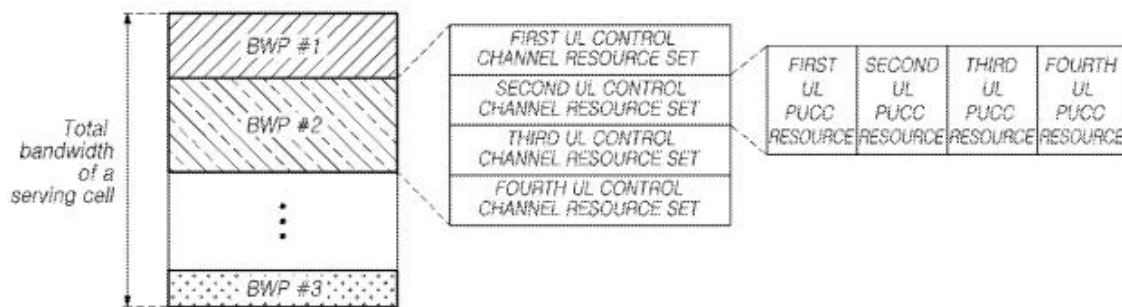
A. The '463 Patent Discloses Improved Methods for Uplink Control Information Transmissions in a Bandwidth Part Environment

The '463 patent discloses an improved method for “transmitting an uplink control information in a next-generation/5G radio access network.” '463 patent, Abst. The method may include the steps of: “receiving uplink control channel resource set configuration information to transmit the uplink control information from a base station, determining one of uplink control channel resource sets contained in the uplink control channel resource set configuration information, determining one of uplink control channel resources configuring the determined uplink control channel resource set, and transmitting the uplink control information through the determined uplink control channel resource.” *Id.* An exemplary embodiment of this concept of the '463 patent's disclosure is illustrated in FIG. 4, reproduced below:

FIG. 4



However, also disclosed and claimed in each challenged independent claim is the requirement that the “UL control channel resource sets are configured for each UL bandwidth part (BWP) configured for the user equipment.” *Id.*, 21:15-17. An exemplary embodiment of this concept is illustrated and described with respect to FIG. 3B, also reproduced below.

FIG. 3B

As described with respect to FIG. 3B, the '463 patent discloses that “the BS may configure total N groups of one or multiple PUCCH resource sets *per each BWP* for a UE.” *Id.*, 9:61-63 (emphasis added). Further, “each PUCCH resource may be defined as PUCCH format configuration information, time/frequency domain PUCCH resource configuration information (or additionally code domain resource configuration information) in the UL BWP, or the like.” *Id.*, 10:6-10.

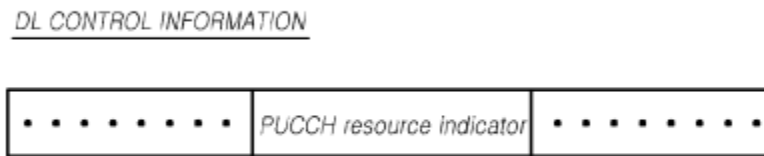
While the '463 patent discloses and claims that the “UL control channel resource sets are configured for each UL bandwidth part (BWP) configured for the user equipment,” the '463 patent distinguishes the concept of configuration of a BWP for a user equipment (also referred to herein as a “UE” or “user terminal”) and activation of a BWP for a UE. The '463 patent discloses that under 5G NR (“New Radio”), “it is required to configure one or more bandwidth parts (BWPs)

constituting bandwidths obtained by subdividing an NR CC and to support a wider and flexible bandwidth operation” *Id.*, 6:67-7:3. While many BWPs may be configured for a UE, the ’463 patent makes clear that only one BWP for a serving cell is activated for uplink and/or downlink at a given time. “The UE may transmit and/or receive UP/DL data by activating one DL BWP and one UP BWP, in the serving cell.” *Id.*, 7:8-9. The ’463 patent also discloses that under the standards governing 5G NR, Release 15, “the NR rel-15 defines that only one DL BWP and one UL BWP are activated and used in an UE at any time.” *Id.*, 7:25-27; *see also id.*, 8:28-32 (“The NR defines a BS to activate and use only one DL BWP and one UL BWP at a predetermined time for each UE in order for transmitting and receiving each of DL/UL radio channel and signal (e.g. PDCCH/PDSCH, PUSCH/PUCCH etc.).”).

Of note, the claimed requirement that the “UL control channel resource sets are configured for each UL bandwidth part (BWP) configured for the user equipment” applies to all BWPs configured for a UE, without addressing whether any of those BWPs are activated for uplink.

Finally, as claimed in each challenged independent claim is the requirement that “the each UL BWP is activated through downlink (DL) control information.” *Id.*, 21:18-19. “[W]hen the UL BWP indication information for the transmission of the PUCCH is included in the DL allocation DL control information, the UL BWP

indication information may be additionally used as UL BWP activation information of the UE and UL BWP switching indication information resulted therefrom.” *Id.*, 11:25-30. An exemplary embodiment of this concept is illustrated and described with respect to FIG. 3C, also reproduced below.



The '463 patent discloses that “DL allocation DL control information may contain PUCCH resource indication information (PUCCH resource information or a PUCCH resource indicator).” *Id.*, 11:1-4. The PUCCH resource indicator “indicates one UL control channel resource, for the transmission of UL control information,” from among the UL control channel resources in the UL control channel resource set. *Id.*, 11:4-7.

B. The Claims at Issue

Consistent with the disclosures introduced above, independent claim 1 recites in full:

1. A method of transmitting uplink (UL) control information by a user equipment, the method comprising:

receiving, from a base station, UL control channel resource set configuration information for UL control information transmission;

determining one of UL control channel resource sets contained in the UL control channel resource set configuration information;

determining one of UL control channel resources contained in the determined UL control channel resource set; and

transmitting UL control information through the determined UL control channel resource,

wherein the UL control channel resource sets are configured for each UL bandwidth part (BWP) configured for the user equipment, and

wherein the each UL BWP is activated through downlink (DL) control information.

'463 patent, 21:2-19 (emphasis added). Independent claims 4 and 7 also include identical "wherein" clauses as those that appear in claim 1. Therefore, the arguments presented below as to the validity of claim 1 apply equally to independent claims 4 and 7.

III. CLAIM CONSTRUCTION

Petitioners contend that for "this proceeding, should receive their respective plain and ordinary meaning as understood by a person of ordinary skill in the art under *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005), except as noted

below.” Pet., 5. The only exception noted by Petitioners is “a controller configured to determine one of UL control channel resource sets contained in the UL control channel resource set configuration information, and determine one of UL control channel resources configuring the determined one UL control channel resource set,” as recited in claim 7, which Petitioners contends is means-plus-function. Patent Owner disagrees, and notes the District Court’s construction of “configured to” to mean “capable of performing the function without modification.” Ex. 1044, 8. No means-plus-function interpretation is needed to construe a “controller” that is “capable of performing the [claimed] function without modification.” Petitioner also contends that “[e]ven if the Board adopts a plain and ordinary meaning construction for the term ‘controller,’ the grounds below illustrate that the claimed ‘controller’ is disclosed in the prior art.” Pet., 7. While Patent Owner contends that the claims are patentable over Petitioners’ challenges for other reasons, this final statement by Petitioners confirms that the Board need not chase down a pie-in-the-sky means-plus-function assertion from Petitioners that is directed toward its litigation theories of indefiniteness rather than the challenges at hand. Consistent with the District Court’s order, the proper construction, if one is to be adopted, is “a controller [capable of performing the function without modification, to] determine one of UL control channel resource sets contained in the UL control channel resource set configuration information,

and determine one of UL control channel resources configuring the determined one UL control channel resource set.” Sharony, ¶48.

Patent Owner raises one other issue that bears on claim construction, namely the claimed requirement of “each UL bandwidth part (BWP) configured for the user equipment.” Both Petitioner’s expert and Patent Owner’s expert agree that there may be many bandwidth parts configured for a user equipment (Sharony, ¶49; Ex. 2006, 29:5-6), but under 5G NR, only one bandwidth part may be activated for a user equipment. This is consistent with the ’463 patent’s discussion of BWP activation under 5G NR. *See* Sec. II.A, *supra*.

Other record evidence confirms this interpretation. Takeda, relied upon in Ground 1, discloses that the “user terminal may be configured with only a single UL BWP, or may be configured with a plurality of UL BWPs.” Takeda, [0103]. Describing Takeda’s Fig. 8, Takeda discloses that the “user terminal activates the UL BWP based on the UL grant detected in the CORESET.” Takeda, [0107]. However, as shown in Fig. 9, when a user terminal receives an uplink grant identifying BWP #2 instead, “the user terminal may deactivate UL BWP #1 and activate UL BWP #2.” Takeda, [0113]. A POSITA would understand that in Takeda’s Fig. 9, the user terminal is configured for both UL BWP #1 and UL BWP #2, despite the fact that only one UL BWP is activated at a given time. Indeed, Takeda discloses that “although the active BWP is changed [as shown] in FIG. 11,

a single UL BWP (for example, UL BWP #1) may always be kept active.”

Takeda, [0125].

The difference between an UL BWP configured for a UE and an UL BWP that is activated for a UE also appears expressly in the claims. Sharony, ¶49. As introduced above, the challenged claims expressly recite, “each UL bandwidth part (BWP) configured for the user equipment.” Additionally, the challenged claims also expressly recite, “the each UL BWP is activated through downlink (DL) control information,” thus calling back through antecedent basis “the each UL BWP” that is configured for a UE, as identified in the prior “wherein” clause. Thus, the plain language of the challenged claims distinguishes between the concept of a UL BWP being configured for a UE and a UL BWP that is activated for a UE. Sharony, ¶49. Simply put, “activated” and “configured for” are different concepts, and should not be construed to be identical. *Id.* Rather, UL BWPs that are configured for a UE can be, but do not have to be, activated. *Id.*

Moreover, while a “UL bandwidth part (BWP) *configured for* the user equipment” is not synonymous with an UL BWP *activated* for the user equipment, the Petition blurs the lines improperly in order to build a hindsight-based obviousness challenge. Yan does not recognize BWPs at all, much less BWPs that are configured for a UE, and therefore does not support the challenges in the Petition.

For the reasons discussed below, each challenge should fail.

IV. THE CHALLENGES

Petitioners assert two grounds in their Petition, and each Ground applies to all challenged claims (claims 1-9), including independent claims 1, 4, and 7.

Ground 1 contends that the claims are obvious over Takeda¹ and Yan,² and Ground 2 contends that the claims are obvious in view of Marinier,³ Yan, and R1-1711853⁴.

A. Prosecution History

The merits of this Petition are weak and contain defects sufficient to render the challenges deficient. In particular, each independent claim includes the following features: “wherein the UL control channel resource sets are configured for each UL bandwidth part (BWP) configured for the user equipment,” and “wherein the each UL BWP is activated through downlink (DL) control information.” During prosecution, the as-filed claims were originally rejected over

¹ Ex. 1006, International Publication No. WO 2019/030929 A1 (“Takeda”); see *also* Ex. 1007, Certified Translation of International Publication No. WO 2019/030929 A1. *See also* Sharony, ¶¶52-54.

² Ex. 1010, U.S. Patent No. 10,736,085 (“Yan” or “Yan- U.S. Patent”). *See also* Sharony, ¶55.

³ Ex. 1011, U.S. Patent Application Publication No. US2014/0056278 A1 (“Marinier”). *See also* Sharony, ¶¶56-58.

⁴ Ex. 1012, Activation/deactivation of bandwidth part (“R1-1711853”). *See also* Sharony, ¶59.

a combination of asserted art. Ex. 1004, 159-167. In response, the application amended the independent claims to incorporate these features and to distinguish over the prior art relied upon by the examiner in the stated rejections. Ex. 1004, 68-74.

As the applicant convincingly argued to the examiner concerning a reference to Yiu applied by the examiner, Yiu “merely teaches about BWP but fails to teach i) receiving any information about each UL BWP” Ex. 1004, 73 (emphasis in original). The applicant also argued that Yiu “does not teach activating each UL BWP through DL control information.” Id. (emphasis in original). In these arguments, which were accepted by the examiner as sufficient to overcome the rejections (Ex. 1004, 50-51), the applicant focused on and emphasized the “each” language in these amendments. For reasons discussed below, at least the “each” language in these challenged claims render them patentable over the asserted Grounds.

B. The Petition's Alleged Motivation to Insert Yan into a BWP Environment Uniformly Fails

i. Yan is Focused on an Activated Spectrum Encompassing the Spectrum Bandwidth, not Configured BWPs

Petitioners allege that Yan's teachings for avoiding UCI mismatch support a reason to combine Yan with Takeda in Ground 1, and Yan with Marinier and R1-1711853 in Ground 2. However, it is undisputed that Yan fails to disclose any

BWPs, and also therefore fails to disclose a concept of a BWP that is configured but not activated for a user terminal. Sharony, ¶55.

Rather, Yan teaches a POSITA to have resource sets for the active spectrum that is usable by a user terminal. Sharony, ¶66. In other words, even if Yan were combinable with Takeda and Marinier/RI-1711853, the teaching that would be understood by a POSITA would be to have resource groups for the BWP that is to be activated and used by the user terminal. *Id.* Yan is directed to 4G LTE scheme (Ex. 2006, 61:21-22 (“Yan was written intended to LTE”)) and does not disclose or suggest to a POSITA to even consider which BWPs may be configured for a user equipment. Sharony, ¶67.

Petitioners cite to Takeda's [0103] for its disclosure of “one or more BWPs configured for the user terminal.” Pet., 34 (citing Takeda, [0103]). But “one or more” is not the same as “each.” Sharony, ¶85. As Dr. Roy testified at deposition, a UE could have two configured BWPs at the same time, but he did not know how many BWPs could be configured for a user terminal at a given time. Ex. 2006, 82:7-12 (“I would have to go back and look at the specification to answer your question.”); *id.*, 80:13-14 (“That means a UE for a particular subframe, okay, may have two bandwidth parts configured.”). Further, Yan looks only at the component carrier, and does not recognize the concept of BWPs that are configured for a UE. Sharony, ¶65.

Moreover, having resource groups for *each* UL BWP that is configured for a user equipment requires a knowledge of how many and which UL BWPs are configured for the user equipment. Sharony, ¶67. Petitioners fail to address this problem with their proposed combinations. Using sleight-of-hand, Petitioners actually propose to have resource sets for the BWP that a user equipment is activated for (or that will be activated for uplink transmission). The critical aspect of the Petitioners' combination relying on Yan, therefore, is not BWPs that are configured for a user equipment, but rather the BWP that is activated for the user equipment. Yan teaches resource groups for an activated spectrum, not for all the BWPs that are configured for a user equipment, even if not activated. Sharony, ¶66. This is a plain shortcoming in the Petition.

ii. The Petition Fails to Advance Credible Reasons for Combining Takeda with Yan

The Petition proposes to combine Yan's resource sets and Takeda's BWPs. But while Takeda discloses BWP-dependent resource mapping, Takeda does not disclose distinct UE-specific control channel resource sets for each UL BWP.⁵ Indeed, Takeda emphasizes transmitting according to the uplink grants via PUSCHs, rather than uplink control channels. Sharony, ¶68. Per Takeda, a "user

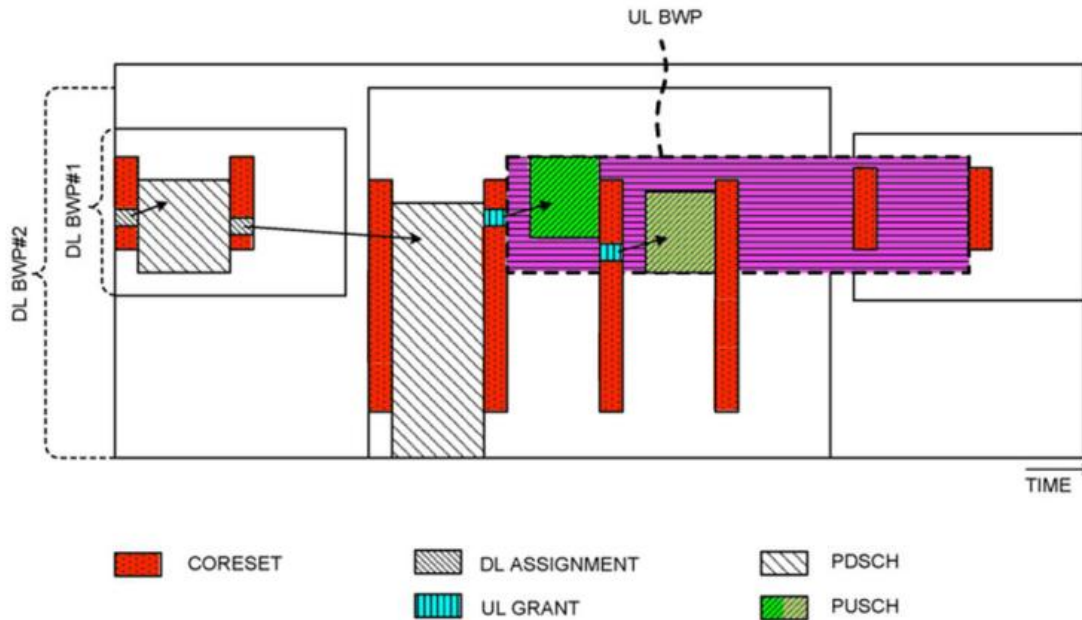
⁵ Takeda discloses activation switching only, such that there is only one active uplink BWP at a time.

terminal transmits the PUSCH scheduled in the UL BWP based on the UL grant.” Takeda, [0107].

In proposing to combine Takeda with Yan to avoid UCI mismatch, Petitioners also fail to realize that Takeda does not suffer the problems of UCI mismatch because 5G NR already includes efficient techniques for UCI transmission. Sharony, ¶¶69-70. A POSITA either would have understood that Takeda already incorporates that solution, or would have recognized that adopting Yan's 4G LTE-specific solution into a 5G NR system like Takeda's would have been undesirable since Yan fails to account for use of BWPs. Sharony, ¶69. Indeed, Yan's proposal is applicable to 4G LTE, while Takeda is based on the 5G NR framework; combining Yan and Takeda in the manner asserted would be technically inconsistent due to standard-generation differences. And as Dr. Roy agreed during deposition, he could not tell whether Takeda suffers from UCI mismatch in, for example, FIG. 9. Ex. 2006, 91:20-92:4 (“Q: So there's nothing about Figure 9 that would tell you whether there's a mismatch of the UCI information and uplink resources in uplink bandwidth part number 2. Is that right? ... A: No, I couldn't tell.”).

First, Takeda discloses using PUSCH transmissions for UCI transmissions, not control channel (PUCCH) segments, in Figs. 8 and 9. Petitioner's annotated version of Takeda's FIG. 8 is reproduced below:

Ex. 1007, FIG. 8 (annotated)



Pet., 12; *see also* Takeda, FIG. 9. As shown in FIG. 8, the UL BWP is identified in purple, and the green and yellow hashed areas represent the PUSCH, in which Takeda includes the UCI. Additionally, the PUSCH transmission is ordered by the base station in the CORESET and UL Grant. Takeda, [0107] (“The user terminal activates the UL BWP based on the UL grant detected in the CORESET. The user terminal transmits the PUSCH scheduled in the UL BWP based on the UL grant.”). Thus, Petitioners create a false narrative, suggesting that Takeda somehow has UCI mismatch, when no such problem exists.

Further, as Petitioners concede and Patent Owner’s expert explains, Takeda uses UL BWPs in accordance with 5G NR. It was well-known to POSITAs that

5G NR adopted a different solution than Yan for avoiding UCI mismatch.

Sharony, ¶70. Specifically, 5G NR supports multiple UCI formats (short/long; ≤ 2 -bit vs > 2 -bit) for that exact reason. An example might be HARQ feedback ACK/NAK bits fitting into a small UCI format, whereas HARQ feedback ACK/NAK with a scheduling request (SR) for an uplink grant, or channel state information (CSI) may require a larger payload and associated UCI format.

Sharony, ¶70. Further, the type of uplink transmission, and the information to be transmitted (e.g. HARQ ACK/NACK, CSI), is specifically requested by the base station via DCI and/or RRC, thus avoiding UCI mismatch. A POSITA would readily understand that 5G NR UCI formats reflect how Takeda would have avoided UCI mismatch, and would not have looked to Yan for some other solution for a problem that did not exist in 5G NR. Sharony, ¶70.

Dr. Roy's testimony at deposition confirms the manufacturing of a problem that did not exist in 5G NR and would not have existed in Takeda. Per Dr. Roy, the base station would not know how many bits a user equipment would transmit via UCI. At deposition, he admitted that "this is an issue that's not discussed here in my declaration," but then described a scenario where "the UE has decided to send traffic on the uplink that the base station, when it sent in the request [for UCI], was not aware of." Ex. 2006, 60:2-17. But this fails to acknowledge 5G NR's existing solution of the base station requesting exactly what it wants from the

user equipment, with the user equipment determining the correct resources for that transmission, and the user equipment only sending what was requested. Sharony, ¶¶70-71; *see also* Ex. 2006, 38:3-10 (“the size of the UCI is dependent on various factors *which are sent from the base station to the UE*. And as a result, the -- the type and the form of *what is being asked for the UE to report* determines the bandwidth -- the portion of the bandwidth resources, the frequency resources that set -- that will be used.”) (emphasis added). In 5G NR, each configured resource set is targeted at specific UCI size ranges. This ensures that the UE selects a resource set that fits the UCI without truncation or excessive padding, i.e., avoiding UCI mismatch. Sharony, ¶71.

Moreover, Dr. Roy conceded that he did not know whether Yan's solution for avoiding UCI mismatch was ever adopted within the 4G LTE standard, and therefore could not answer whether Yan's solution was considered desirable within the 3GPP standards community or even within 4G LTE. Ex. 2006: 92:5-22 (“But if you're asking whether the specific steps of Yan ever made it into a TS, I do not know.”); *id.*, 93:1-5 (testifying that he does not know “whether the specific steps of Yan ever made it into a TS or technical specification for 5G new radio”). On the other hand, Dr. Sharony confirmed that Yan's uplink resources resizing/adjusting solution has not been adopted or included in either the 4G LTE or 5G NR specifications to avoid increasing UE processing load. Sharony, ¶72.

Relatedly, Petitioners also manufacture a problem of power consumption in Takeda. Dr. Roy's declaration states, "from the UE perspective, a POSITA would have been motivated to modify Takeda's method for transmitting UL signals to incorporate Yan's resource allocation method to more efficiently use UE power reserves. Using Yan's resource allocation method would further Takeda's stated goal of reducing UE power consumption when transmitting UL signals." Ex. 1002, ¶107 (citing Takeda, [0013]). However, the user equipment in Takeda monitors the CORESET, which (per Takeda's FIG. 8 and FIG. 9) occupies less than all the available spectrum of the BWP, and occupies even less than the DL BWP that is activated at a given time. Sharony, ¶73. And the resulting PUSCH uplink transmission, which includes UCI, also occupies less than the UL BWP spectrum. Further, the BWP is not consumed completely by control, but instead includes both control and data in the PUSCH. *Id.* In any event, the portion of the BWP that is actually monitored by the UE and used for uplink control data is already efficient in Takeda and does not compel a combination with Yan. *Id.*

Additionally, Yan's scheme also adjusts resources capacity to match the UCI size, which may increase the UE's processing load and energy or power consumption, and therefore be contrary to the alleged goal of modifying Takeda in view of Yan. Sharony, ¶55. Yan also aims to minimize signaling overhead and

simplify control channel configuration, which contrasts with adding UL control channel resource set configuration information supporting multiple BWPs. *Id.*

The Petition alleges that “a POSITA would have been motivated to use the UL resource allocation methods of Yan with 5G BWP configurations (as discussed in Takeda) to further Yan’s goal of power-efficient UL signaling.” Pet., 16-17. But given that Takeda’s CORESET and PUSCH uplinks occupy less than the full UL BWP, and Dr. Roy’s uncertainty whether Takeda even suffers from UCI mismatch (*see* Ex. 2006, 91:20-92:4), it is a complete guess that Yan’s methods would somehow yield a power savings in Takeda or would even address a problem in Takeda. Sharony, ¶¶73-74. Dr. Roy even conceded at deposition that comparing power efficiencies in 4G LTE and 5G NR are challenging at best. Ex. 2006, 41:10-13 (“So I don't believe you can make a direct, you know, efficiency comparison to 4G LTE because there are various parameters that are different, notably the carrier bandwidths are different.”); *id.*, 39:9-41:17. Further complicating Petitioners’ process of trying to compare power efficiencies by looking solely at bandwidths, not only is the 4G LTE carrier bandwidth likely different from a BWP bandwidth in 5G NR, but the bandwidths actually used for UCI transmissions in Takeda occupy a fraction of the UL BWP. Sharony, ¶74.

Thus, there is no meaningful argument that using Yan’s resource set mechanism applicable to 4G LTE could somehow yield a power savings for either

CORESET monitoring or UCI transmission in Takeda's 5G-specific technology.

Sharony, ¶75. In fact, Yan's adjustable scheme (which may also dynamically increase or decrease resources capacity to fit the UCI, per Yan, 22:26-50) requires more processing in the UE and therefore more power consumption. Sharony, ¶¶55, 75. This is another fabricated reason from the Petitioners trying to justify a hindsight-based reason to jam Yan unnecessarily into Takeda.

Moreover, while Dr. Roy characterizes "reducing UE power consumption when transmitting UL signals" as a "stated goal" of Takeda (Ex. 1002, ¶107), he overlooks another "stated goal" in [0008] of Takeda. There, Takeda discloses the desire of "reduc[ing] the processing load (for example, the processing load due to blind decoding of each frequency band) in a user terminal," particularly when using BWPs in a carrier. Takeda, [0008]; Ex. 2006, 54:7-14 ("Q: Do you believe that one of Takeda's stated goals is reducing a processing load of the user terminal? A: So if your stated goal maps to problem addressed or solved by the invention, yes."). While the 5G NR solution for UCI mismatch serves this goal by identifying the resources to be used for UCI transmissions and identifying exactly what control data the UE should send via the UCI, Petitioners' combination of Yan with Takeda pushes additional determinations to the UE and contradicts this goal by increasing the UE processing load. Sharony, ¶¶76-77. Thus, Petitioners' proposed modification is not needed in Takeda, and is directly contrary to

Takeda's "stated goal" of reducing the UE's processing load, along with energy or power savings. Sharony, ¶¶54, 77.

Finally, Petitioners argue that a "POSITA would have been motivated to modify Takeda with the teachings of Yan to provide backwards network compatibility" Pet., 13. Petitioners continue, "a POSITA would have recognized benefits for 5G-capable UEs to continue to connect with 4G LTE BSs." Pet., 14. They then assert that "[t]o facilitate backwards compatibility, a POSITA would recognize efficiencies in implementing Yan's method of allocating UL channel resource sets (e.g., the steps of Yan's FIG. 4) with Takeda's 5G NR BWPs." Pet., 15. But this is illogical. Backwards compatibility is achieved by having a user equipment that is able to comply with multiple standards, such as both 5G NR and 4G LTE, such that it could comply with either standard.⁶ Sharony, ¶78. But ensuring backwards compatibility does not mean that a POSITA would be motivated to incorporate previous generation, 4G LTE-standards solutions into a system designed to operate according to 5G NR standards. Sharony, ¶80. Mixing standards and behaviors does not ensure

⁶ In a similar example, a router that is 802.11ac-compatible and therefore operates strictly on a 5Ghz band would also need to include a 2.4Ghz radio to comply with 802.11g, which operates strictly on a 2.4Ghz band. But a router that includes only a 5GHz radio and programming to only comply with the 802.11g standard would not be able to function according to either standard. Sharony, ¶79.

backwards compatibility, and instead creates a risk that the user equipment might not comply with either standard because it is not fully compliant with either standard. *Id.*

For these reasons, and as supported by the expert opinions of Dr. Sharony, the Petition fails to advance a credible reason to combine Takeda and Yan as asserted. Takeda (power reduction via BWPs) and Yan (dynamic resource adjustment) are directed to inconsistent goals because Yan requires UE-side runtime calculations, thus increasing processing load and power draw, contrary to Takeda's goal of power reduction at the UE. Sharony, ¶81. Therefore, the challenged claims are not unpatentable at least because the proposed combination of prior art is unsupported by the necessary motivation.

iii. Neither Takeda Nor Yan Discloses or Suggests UL Control Channel Resource Sets for Each UL BWP

Notwithstanding the Petition's failure of motivation to combine Yan and Takeda, a proposed combination of these references also fails to disclose or suggest every claimed feature of the challenged claims.

As noted above, while Takeda discloses BWP-dependent resource mapping, Takeda does not disclose distinct UE-specific UL control channel resource sets for each UL BWP, as required by the challenged claims. Takeda emphasizes transmitting according to the uplink grants via PUSCHs. Sharony, ¶83. Per

Takeda, a “user terminal transmits the PUSCH scheduled in the UL BWP based on the UL grant.” Takeda, [0107].

Further, Takeda discloses activation switching only, such that there is only one active uplink BWP at a time. The Petition proposes that a POSITA would have been motivated to combine Yan and Takeda such that Yan's UL resource sets would have been configured for each UL BWP configured for the user equipment. Pet., 34 (“When incorporating Yan's teachings for allocating UL resources, including the inclusion of UL control channel resource sets, with Takeda's BWP based UL transmission method ..., the resulting UL resources and the UL control channel resource sets that include those resources would have been configured for BWPs that are configured for the UE.”). But this conclusion is driven by hindsight bias given that Takeda only has one active uplink BWP at a time, and Yan only sends resource sets for the active component carrier. Sharony, ¶84. Petitioners advance no credible reason why a POSITA would have been motivated to configure UL control channel resource sets for each UL BWP configured for the user equipment when only one UL BWP would be active according to Takeda's disclosures. *Id.* The Petition's assertion to the contrary is unwarranted and unsupported.

For all these reasons, the merits of the challenges asserted in the Petition fails and the patentability of each challenged claim should be confirmed.

C. Ground 2 Lacks Credible Motivation and Even if Combined, the Asserted References Fail to Disclose or Suggest Every Claimed Feature

As noted above, it is undisputed that Yan fails to disclose any BWPs, and also therefore fails to disclose a concept of a BWP that is configured for a user terminal. Sharony, ¶89. While Petitioners propose to combine Marinier with Yan, Marinier also fails to disclose a concept of a BWP that is configured but not activated for a user terminal. *Id.* Marinier describes multi-MAC-instance uplink operation from a wireless transmit/receive unit (WTRU) to multiple serving sites and is directed to 4G LTE technology, not 5G NR technology. Sharony, ¶56. Marinier's relevant disclosure regarding bandwidth parts appears in [0130], quoted below:

In an example, the bandwidth (BW) utilized by the different serving sites may be divided into a plurality of BW parts. Each serving site may be configured to utilize one or more of the BW parts for communicating with the WTRU. For example, *each BW part may be treated as a component carrier in carrier aggregation*. For example, each BW part may include corresponding PUCCH and PUSCH resources. Some bandwidth parts may include PUCCH without a PUSCH (e.g., for CSI reporting to a serving site) and/or PUSCH without PUCCH.

Marinier, [0130] (emphasis added). As noted above, each BWP of Marinier may be treated as a component carrier, meaning that each BWP includes PUCCH and/or PUSCH resources to be used for transmissions. Sharony, ¶90. Marinier does not mention UL control channel resource sets or determining one of the UL control channel resource sets based on a size of the UCI, and also omits any disclosure regarding the 5G NR concept of activating a BWP. *Id.*

Indeed, Marinier does not use the BWP concept at all in the 5G NR sense, because Marinier's BW parts used in the LTE multi-carrier context are frequency partitions to avoid collisions and interference during concurrent transmissions, but do not include an activation/deactivation mechanism or control resource sets. Sharony, ¶90. As Dr. Sharony explains, Marinier's entire purpose is to avoid collisions and interference between concurrent transmissions in different frequency bands that are activated and used for transmission. *Id.* Marinier discloses that "[w]hen used herein the term concurrent transmission to multiple serving sites may refer to one or more of simultaneous transmission to multiple serving sites at the same time (e.g., transmitting to multiple serving sites in the same subframe using the same and/or different frequency resources), transmission to multiple serving sites using the same frequency resources within a specified amount of time (e.g., transmitting to multiple transmissions to different serving sites using the same frequency within a relatively close amount of time and/or during the same RRC

Connected session), and/or the like.” Marinier, [0100]. Marinier’s paragraph [0103] specifically discusses an example of “concurrent transmission to multiple serving sites,” and Marinier’s paragraph [0129] discloses an example where “physical channels associated with different MAC instances may be used in the same subframe if the transmission/reception of the physical channels occurs in different frequency channels and/or frequency bands” Per Dr. Sharony, these disclosures inform a POSITA that Marinier is directed to frequency channels or frequency bands that are activated specifically for handling concurrent transmissions to avoid interference and collisions. Sharony, ¶90.

Further, Marinier’s DCI controls UL scheduling but never activates a BWP entity. Sharony, ¶91. The Petition carefully avoids this truth, relying instead on an unsupported theory of inherency to argue that “a POSITA would further recognize that a bandwidth part ‘containing’ the PUCCH used for UL transmission *would need to be activated* to perform the UL transmission.” Pet., 53 (emphasis added).⁷ But there is no disclosure in Marinier of “activation through DL control information.” As such, like Yan, Marinier also does not disclose or suggest a BWP

⁷ The concept of “BWP activation via DCI” was introduced in 3GPP Release 15 (NR), after Marinier’s publication date. Since Marinier (2017) predates 3GPP Release 15 and does so in the context of 4G LTE instead of 5G NR, it cannot reasonably be relied upon to teach or suggest this feature.

as a component carrier that is configured but not activated for a user terminal.

Sharony, ¶91.

Petitioner's proposed motivation to combine Marinier and Yan is set forth beginning at p. 44 of the Petition, and proposes "to incorporate Yan's UL channel resource allocation methods to determine the most efficient UL channel resource based on a size of the UCI." Pet., 44-45 (citing Ex1002, ¶201). Notably, without citing to any expert support, Petitioners allege that Yan's disclosure of "mismatch of UL channel resource capacity and UCI size is applicable for Marinier's BWP-based UL signaling configuration." Pet., 45 (without citation to evidence).

Concluding, Petitioners assert that "[u]sing Yan's resource allocation methodology within UL BWPs of Marinier would ensure that UL resources are used efficiently by UEs." Pet., 45.

However, as discussed above, ensuring that UL resources are used efficiently by UEs is only relevant for the BWPs that are actually used for transmissions. Sharony, ¶93. As such, a POSITA familiar with both Yan and Marinier would not have been motivated to combine these references to disclose or suggest having control channel resource sets for each UL BWP configured for a UE, and then activating an UL BWP via DCI. *Id.* Marinier does not use BWPs in a 5G NR context, and instead selects uplink resources to avoid uplink collisions, which is unrelated to BWPs, UL control channel resource sets, and determining

one of the UL control channel resource sets based on a size of the UCI. Sharony, ¶¶56, 64.

Rather, even if Yan were combined with Marinier/R1-1711853, the teaching that would be understood by a POSITA would be to have resource groups for the BWP that is active and used by the user terminal. Sharony, ¶93. Yan does not disclose and does not suggest to a POSITA to even consider which BWPs may be configured for a user equipment, such that resource sets would be configured for all configured BWPs regardless of activation status. *Id.*

Petitioners' proposed combination of Yan and Marinier, namely to result in having resource sets for each BWP configured for a UE without regard for whether a BWP is active and used for transmission, is a fabrication of Petitioners' making because neither Yan nor Marinier would suggest having resource sets based on configuration status rather than activation status of a BWP. Sharony, ¶94. Even in a combination of Marinier, Yan, and R1-1711853, element 1[e] is absent and is neither expressly disclosed nor suggested. *Id.*

D. The Petition is Facially Deficient

Finally, notwithstanding the shortcomings of each Ground as discussed above, the Petition also fails to fully address each of the wherein clauses added during prosecution to each independent claim in each Ground, as demonstrated below.

i. The Petition is Facially Deficient as to Ground 1

Petitioners argue that claims 1-9 are unpatentable over Takeda in view of Yan. This challenge begins on page 10 of the Petition, and continues through page 43. However, the operative portions of the Petition for the purpose of this shortcoming occur at pages 32-34, addressing element 1[e], and page 35, addressing element 1[f].

In the section addressing the sixth *Fintiv* factor, Petitioners broadly assert that the Takeda reference “discloses each of the two wherein clauses that the Examiner argued were missing from the prior art.” Pet., 69 (citing Ex. 1002, ¶¶127-135; Ex. 1004, 44-53). But this is incorrect because Petitioners fail to fully address these wherein clauses in their merits challenges. While Petitioners’ analysis of both elements is deficient, this shortcoming is best introduced with regard to element 1[f].

In addressing element 1[f], “wherein the each UL BWP is activated through downlink (DL) control information,” Petitioners’ challenge is limited to quoting two sentences from Takeda *without analysis*. Pet., 35. Petitioners simply quote Takeda’s sentences: “[t]he user terminal may control activation and/or deactivation of *one or more UL BWPs* configured for the user terminal based on the explicit or implicit indication information. The explicit indication information may be, for example, DCI [downlink control information] (UL grant).” Pet., 35 (emphasis

modified from original). But “one or more” is not the same as “each.” Sharony, ¶¶85-88. This brief quotation of Takeda fails to explain how Takeda allegedly discloses that “the *each* UL BWP is activated through downlink (DL) control information” in element 1[f]. (emphasis added). *Id.*

Petitioners characterize the examiner's amendment that added “the” to “the each UL BWP” in element 1[f] as a “non-substantive examiner's amendment.” Pet., 4 (describing the examiner's amendment in the notice of allowance at Ex. 1004, 44-53). But this characterization rings false, and fails to acknowledge that this amendment adds antecedent basis to the “each UL BWP.” Moreover, this antecedent basis points to element 1[e], which recites “wherein the UL control channel resource sets are configured for *each UL bandwidth part (BWP) configured for the user equipment.*” (emphasis added).

Thus, turning back to Petitioners' analysis of element 1[e], Petitioners also fail to address the “each” aspect of this element. Initially, Petitioners contend that Takeda “teaches multiple UL control channels ... are scheduled for transmission within each particular bandwidth part.” Pet., 32. But the cited portions of Takeda provide no disclosures supporting this contention as it relates to “each UL bandwidth part (BWP)” as claimed.

Petitioners quote Takeda's [0117], which addresses contents of “UL BWP #1.” Continuing this limited focus on only one BWP, Petitioners state that “FIGS.

8-9 of Takeda show that multiple UL resources are configured for a *single UL BWP*.” Pet., 32 (emphasis added). Petitioners continue, concluding that “Takeda discloses that sets (encompassing multiple UL resources) are configured for a BWP.” Pet., 33.

Petitioners acknowledge that “BWPs are configured for the user terminal,” Pet., 34 (emphasis omitted), but plainly fail to identify which BWPs are configured for a user terminal. Rather, Petitioners simply rely on Takeda’s vague disclosure regarding “one or more BWPs configured for the user terminal” without addressing the claim requirements that must be satisfied for each UL BWP configured for a user terminal. Because the Petitioners are not specific about the number or identity of BWPs configured for a user terminal, Petitioners therefore also fail to establish that Takeda teaches the claimed features of element 1[e] for *each* UL BWP configured for a user terminal. Sharony, ¶¶85-88.

To the extent that Petitioners believe Takeda “discloses each of the two wherein clauses that the Examiner argued were missing from the prior art,” as alleged on page 69 of the Petition, they have failed to show how or where Takeda allegedly discloses these complete wherein clauses. The Petition’s shortcoming on this point is fatal to Petitioners’ Ground 1 because Petitioners do not even realize Takeda’s shortcoming in this regard, and therefore do not rely on Yan to remedy this shortcoming.

Thus, Ground 1 fails against claim 1, and because the Petition relies entirely on its analysis for elements 1[e] and 1[f] to challenge the corresponding claimed features of independent claims 4 and 7, Ground 1 also fails against these claims as well. *See* Pet., 40 (addressing elements 4[c] and 4[d]); 42-43 (addressing elements 7[d] and 7[e]).

ii. The Petition is Also Facially Deficient as to Ground 2

Petitioners argue that claims 1-9 are unpatentable over Marinier in view of Yan, further in view of R1-1711853. This challenge begins on page 43 of the Petition, and continues through page 63. The operative portions of the Petition for the purpose of this shortcoming occur at pages 51-52, addressing element 1[e], and pages 52-54, addressing element 1[f].

Once again, Petitioners fail to establish how these references, considered alone or in combination, disclose or suggest every claimed features of elements 1[e] and 1[f].

Looking at element 1[e], Petitioners rely on Marinier to disclose the “use of BWPs for communicating between a WTRU and a serving site.” Pet., 52. Marinier discloses that “[e]ach serving site may be configured to utilize one or more of the BW parts for communicating with the WTRU,” and “each BW part may include corresponding PUCCH and PUSCH resources.” Pet., 52 (quoting Marinier, [0130]). Petitioners then point to a different section of Marinier, which

discloses that “BWPs may be specifically configured for each WTRU.” Pet., 52 (citing Marinier, [0147]). But these citations are not explained by Petitioners, and miss the point of establishing the claimed characteristics of “each UL bandwidth part (BWP) configured for the user equipment” in element 1[e]. Sharony, ¶95. In particular, while Marinier discloses that BWPs may be specifically configured for each WTRU, Marinier fails to disclose that “UL control channel resource sets are configured for each” such UL BWP configured for a user equipment. *Id.*

Next, addressing element 1[f], Petitioners allege that Marinier “discusses UL grants within DCI” that direct a WTRU to transmit on an UL channel. Petitioners assert that “[a]s Marinier discloses that BW parts (containing PUCCH resources) are used for communication between serving sites and WTRUs (*Id.*, [0130], [0147]), a POSITA would further recognize that a bandwidth part ‘containing’ the PUCCH used for UL transmission would need to be activated to perform the UL transmission.” Pet., 53. But Petitioners have to do a lot of work to connect the dots in Marinier because Marinier fails to correlate DCI with activation of a UL BWP, much less “each UL BWP” as claimed. Specifically, Petitioners try to tie the DCI to a PUCCH “included in an inactive BW part,” and interpret Marinier’s DCI as commanding the user equipment to activate “the inactive BW part through the DL control information that contains the UL grant, so that the UE can transmit UCI on the PUCCH that is included in the BW part.” Pet., 53. The result of this

analysis is that Petitioners invent an inactive BW part in Marinier, and then invent a command to activate that inactive BW part based on the DCI. This is contrary to Marinier's disclosures, which focus on simultaneous transmissions via partitioned frequency channels/bands, thus indicating that each frequency partition is active. Sharony, ¶90.

Further, generating an undisclosed scenario in Marinier for the purposes of crafting a challenge is a violation of the statutory limits of IPRs, which permit challenges based on patents and printed publications only, not undisclosed scenarios created by Petitioners. And in any event, even if this theory had basis in Marinier's disclosures, which it does not, Petitioners still fail to address how this scenario applies to "the each UL BWP" defined in elements 1[e] and 1[f]. And while Petitioners look to R1-1711853 for use of DCI with DL or UL bandwidth parts, this additional reference still fails to address "the each UL BWP" defined in elements 1[e] and 1[f].

Ground 2 therefore also fails against claim 1, and because the Petition relies entirely on its analysis for elements 1[e] and 1[f] to challenge the corresponding claimed features of independent claims 4 and 7, Ground 2 also fails against these claims as well. *See* Pet., 58-59 (addressing elements 4[c] and 4[d]); 61 (addressing elements 7[d] and 7[e]).

**E. Independent Claims 4 and 7, and all the Dependent Claims,
Survive for These Same Reasons**

As introduced above, independent claims 4 and 7 include the same wherein clauses as argued for claim 1, and survive Petitioners' challenges for the same reasons addressed above.

V. CONCLUSION

For the reasons presented above, the Petition fails to establish the unpatentability of any challenged claim.

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CERTIFICATE OF WORD COUNT

The undersigned certifies that the foregoing PATENT OWNER'S RESPONSE complies with the type-volume limitation in 37 C.F.R. § 42.24(b)(2). According to the word-processing system's word count, the brief contains 8,538 words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

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CERTIFICATE OF SERVICE

Petitioners have consented to e-mail service in this proceeding. Pursuant to 37 C.F.R. §42.6, the undersigned certifies that on this date, a copy of the foregoing document was served by email upon the following counsel at the below email addresses:

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